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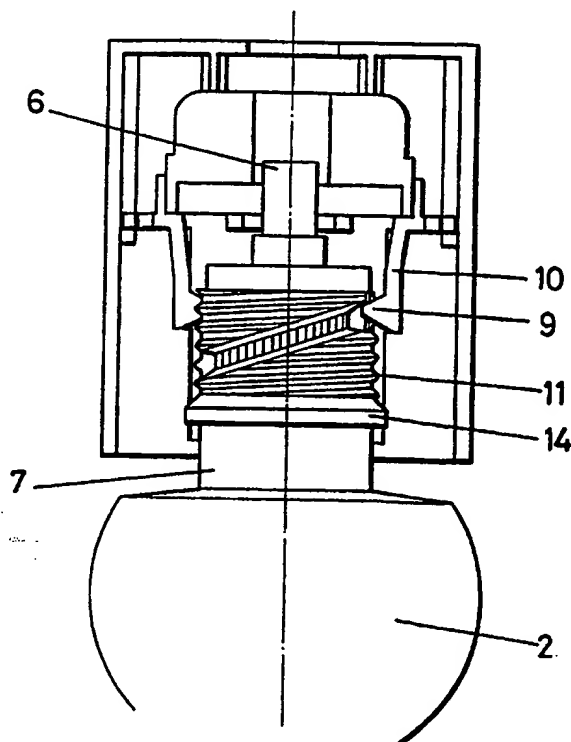
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(54) Title: EVAPORATOR DEVICE OF VOLATILE PRODUCTS WITH VARIABLE EVAPORATION INTENSITY

## (57) Abstract

The adjustment of the intensity of evaporation is conducted by means of the variation in the relative position between the upper end (6') of the wick (6) which absorbs the product of the vessel (2) and the electroheating resistors (5) which favour the evaporation of said product, and more specifically keeping static said resistors and the assembly constituted by the vessel (2) and the wick (6) being displaceable. For this, said vessel (2) with any configuration, is provided with at least one revolution sector (7) in which a helicoidal groove (8) is established, of great pitch, operating as thread for the axial displacement of the container (2), when a rotational movement is applied to the same, at least one pair of opposed teeth (9) collaborating with said groove (8) which are finished off with elastically deformable arms (10) of the casing (1).



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EVAPORATOR DEVICE OF VOLATILE PRODUCTS  
WITH VARIABLE EVAPORATION INTENSITY

D E S C R I P T I O N

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**OBJECT OF THE INVENTION**

The present invention refers to an evaporator device of volatile products, be they environmental products or insecticide products, of the type which use electroheating resistors to improve the evaporation or volatilization of the product, and of those which use a wick which absorbs said product from the corresponding container vessel up to the area of influence of the electroheating resistor.

**BACKGROUND OF THE INVENTION**

Evaporators of volatile products which are provided with a vessel in which the product in question is housed are well known, whether dealing with an environmental product or with an environmental insecticide, a wick being extended between the bottom of said vessel and the electroheating resistor through which said product rises to reach the area of influence of the resistor.

In this type of devices and as is obvious, the intensity of the evaporation or diffusion of the product is constant, whilst product exists in the container vessel.

However, in practice, it may be desirable to decrease or increase as desired, in specific moments, the

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intensity of the environmental supply of the product. In this sense, a solution is known which is included in Utility Model 9002819, according to which, the electroheating resistor is assembled with floating nature in the centre of the device, in such a manner, that by means of guides and of a manual activating mechanism, it is capable of moving axially, varying its level of confrontation to the upper end of the wick and, consequently, varying its effectiveness as heating element and a level of diffusion of the product.

However, this solution results to be structurally complex since it requires a resistor assembled on a special support, moveable, which must be related to the plug socket through flexible cables, which permit its axial movement, all of which, increases the difficulty and makes its constructive process expensive.

#### DESCRIPTION OF THE INVENTION

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The device proposed by the invention solves in a totally satisfactory manner the previously indicated problem, based on a completely different concept, specifically based in maintaining static the electroheating resistor and to achieve the displacement of the vessel, and consequently the wick which is associated to the same.

More specifically, it has been provided, that said vessel presents at least one revolution sector in which a helicoidal groove is established which determines a large pitch thread, whilst in the casing of the device, holder of unmoveable nature of the electroheating resistor, at least one pair of opposed teeth are esta-

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blished, functioning as complementary threads, which determine, for the container vessel, an accused axial displacement, when a rotational movement is administered to the same.

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According to another of the characteristics of the invention, said helicoidal groove of the vessel may present closed ends, in such a manner that they constitute rotation restricting stops in one and another direction, which establish the two limit positions of the maximum and minimum intensity of evaporation, at the same time that said opposed attachment and displacement teeth of the vessel as regards the casing, are assembled on elastically deformable arms which, with a specific effort, permit the assembly and disassembly of said vessel when it is necessary to replace the same. However, said rotation restricting stops may be obtained by other means, such as for example, by means of a hook acting on a lip of the vessel

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Given that the container vessel is generally constructed into a bottle provided with a screw stopper for a sealed closure during the storage prior to its consumption, it has been foreseen that, optionally, it may be the actual thread corresponding to the stopper of the container, which replaces the previously indicated helicoidal groove, coupling the teeth of the casing to said thread, in which case, the same effect is obtained as in the previous case, though with a slower axial movement, which requires a wider rotational movement, requiring the existence of complementary means to prevent the total accidental uncoupling of the vessel as regards the casing. It is also possible that the helicoidal large pitch groove shall be superposed on the actual thread of

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the stopper.

In any case, it is achieved that as from a fixed casing in which a resistor or set of also fixed  
5 electroheating resistors are established, the intensity of evaporation can be adjusted as desired, with only the supplying of a rotational movement to the container vessel of the product, which additionally is more easily coupled and uncoupled in the centre of said casing.

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According to another of the characteristics of the invention it has been provided that the device include indicating means of the level of intensity of evaporation, which act depending on the relative position  
15 between the casing of the device and the body of the container, either detecting the axial position of the latter, or else its angular positioning, in any case, as regards the fixed casing.

## 20 DESCRIPTION OF THE DRAWINGS

To complement the description which is being made, and with the object of helping to a better understanding of the characteristics of the invention, according to a preferred exemplary practical embodiment of the  
25 same, a set of drawings is enclosed, forming integral part of said description, in which, with illustrative and non limitative character, the following has been represented:

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Figure 1 shows an exploded, side elevational representation of an evaporator device of volatile products with variable evaporation intensity embodied according to the object of the present invention, in

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which the casing of the device appears partially sectioned in order to show clearly its internal structure, according to a preferred exemplary practical embodiment of the invention, in which the helicoidal groove is placed on the actual thread of the container and in which the casing includes a retention hook for said container.

Figure 2 shows another side elevational view of the assembly represented in the previous figure, with the same type of representation and with the device turned 90°.

Figure 3 shows a side elevational view of the device of the previous figures, opposed to that of figure 1 and with the casing without being sectioned.

Figure 4 shows in turn, a side elevational view which is similar to that of figure 2 though also with the casing without being sectioned.

Figure 5 shows a plan view of the assembly represented in figure 3 and 4.

Figure 6 shows a similar representation to that of figure 2 though corresponding to a practical embodiment in which the helicoidal groove is placed independently from the thread of the container.

Figure 7 shows a cross section of the assembly represented in the previous figure, according to the cut line A-B of said figure.

Figure 8 shows a side elevational view of an assembly similar to that of figure 6, in which the

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configuration of the container varies and in which the casing of the device, without being sectioned, appears turned 90° as regards the position of figure 6.

5                   Figure 9 finally shows a similar representation to that of figure 8, though with the casing sectioned and according to a practical embodiment variant in which the device uses the actual thread of the vessel, initially usable for the closing stopper of the same, as means of  
10 adjustment for the intensity of evaporation.

#### PREFERRED EMBODIMENT of THE INVENTION

In view of these figures and especially of  
15 figures 1 through 5, it may be observed how in the device recommended, participate as any conventional device of this type, a casing (1), capable of receiving the container vessel (2) of the product dealt with, be it an environmental product or an insecticide product, said  
20 vessel which, as is also conventional, couples to the casing (1) generally by partial "plugging", said casing (1) being provided with a side extension (3) finished off with a plug socket (4), for connection to the electric supply network of a set of electroheating resistors (5),  
25 which in the present case are of the "PTC" type, advantageously established in the centre of the casing (1), and which also in the present case, are fixed, a wick (6) being established between the location area of said resistors (5) and the bottom of the vessel (2), said wick  
30 which, by capillarity, absorbs said product, making it rise towards the area of influence of the resistors (5).

Then, according to the essentiality of the invention, and as has just been pointed out, the elec-



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troheating resistors (5) are fixed, being established unmoveably in the centre of the casing (1), wick (6) being, together with the actual vessel (2), those which are axially displaceable in the centre of the casing (1),  
5 to penetrate the upper end of said wick (6) in greater or lesser degree, in the field of influence of the PTC'S (5).

For this and as has been especially observed in  
10 figure 1, the body of the vessel (2), which may adopt any configuration, presents at least one sector (7) of revolution, in which a helicoidal groove (8) is established, which determines a large pitch thread, in which at least one tooth (9) plays, which forms part of the casing  
15 (1) and preferably placed at the free end of an arm (10) which is elastically deformable, in such a manner that said tooth (9) acts as thread which causes the rapid axial advance in one or another direction of the vessel (2), and consequently of the upper end of the wick (6),  
20 when said vessel (2) is provided with a rotational movement, in one or another direction, through the end and lower sector of the same which projects as regards the casing (1), as is also observed in figure 1.

25 Specifically, in the exemplary practical embodiment of these figures 1 through 5, the groove (8) is superposed to the actual thread (11) of the container (1) initially foreseen for the closing stopper of the same, though said groove may be independent from the  
30 thread (11), as happens in the exemplary practical embodiment represented in figure 6, or else it may be usable as groove of the actual thread (11) as in the case represented in figure 9, with the exception that in this case and as is obvious, the adjustment operation results

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to be slower since the thread pitch (11) is smaller than that of the groove (8), also having to adapt the tooth or teeth (9') to said thread (11) also with less depth than the groove (8).

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Thanks to this simple operation, the upper end of the wick (6) is capable of remaining confronted to the electroheating resistors (5), or to adopt a lower position in which the thermal influence of said resistors is much less and in consequence, the intensity of the evaporation of the product dragged by the wick (6) from the interior of the bottle or vessel (2) is also less.

15 In order to avoid the total uncoupling of the container (2) during the adjustment operation, in this exemplary practical embodiment it has been provided, that on the casing (1), a hook (12) of tilting character is assembled, the end positions of which have been represented in continuous and discontinuous lines in figure 1, 20 trigger which acts, by means of its retention tooth (13) on the stepping defined by a perimetral projection (14) operationally established in the container (2).

However, and according to the embodiment 25 variant represented in figure 6, the groove (8) may present closed ends in such a manner, that it may act in a complementary way as rotation restricting stop both in one and another direction for the vessel (2) and in consequence, as stop which impossibilites the accidental uncoupling of the vessel (2) as regards the casing 30 (1).

In this case, for the assembly and disassembly of the vessel (2), in the ineludible operations of the

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replacement of the same, the elastic deformability of the arms (10) have been foreseen, in which the teeth (9) are placed, and especially the existence of conical fronts of said teeth, which are complementary of another conical front (15) established on that actual container (2), in the access zone immediate to the groove (8).

In the case represented in figure 9, in which the actual thread (11) of container (2) is used, previously used for the stopper, as groove for the axial displacement of the same, the possibility of closing the ends of said thread (11) does not exist, due to which the hook (12) of figure 1 may be used as retention means for the container (2), or else elastically deformable flaps (16), established on the mouth of the actual casing (1) and provided with the same retention teeth (13) which act on the same stepping defined by the projection (14) of the container (2).

Given that the intensity of evaporation depends on the relative positioning between the container (2), moveable, and the casing (1), fixed to the wall by means of the plug socket (4), in order to detect visually the level of intensity selected at each moment, it has been provided, according to the embodiment variant of the figures 1 through 5, that the body (2) of the container, in its visible sector, be provided with a scale (17), moveable, which in the rotational movement of said container (2) changes its relative position as regards a fixed pointer (18) established on the casing. However, instead of detecting the angular position of the container (2), as in this embodiment, the axial position of the same may be used, as in the example represented in figure 8, in which case, the graded scale (17') is the one which

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is fixed, being placed on the actual casing (1), specifically on one or both sides of a deep vertical groove (19), in the centre of which, a circumferential mark (18') plays, established peripherically on the body (2)  
5 of the container, which shall obviously be displaced along the scale (17'), in one and another direction, when the body of the container (2) also turns in one or another direction.

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C L A I M S

1.- Evaporator device of volatile products with variable evaporation intensity, which being indistinctly applicable both to environmental products and to insecticides and being of the type which are provided with a casing which is holder of a plug socket for feeding a resistor or set of electroheating resistors, acting on a wick which emerges from a container vessel of the product in question, said vessel being couplable with unmoveable character to said casing, is characterized in that said vessel (2) is axially displaceable in the centre of the casing (1), in order that the upper end of its wick (6) be influenced in greater or lesser degree by the field of influence of the electroheating resistors (5), by means of a greater or lesser approximation to the same.

2.- Evaporator device of volatile products with variable evaporation intensity, according to claim 1, characterized in that the vessel (2) is provided with at least one revolution sector (7) in which a helicoidal groove (8) is established with large pitch, for the axial displacement of said vessel with the collaboration of at least one tooth (9) associated to the casing (1) operating as male and fixed thread, complementary to the female thread defined by the helicoidal groove (8).

3.- Evaporator device of volatile products with variable evaporation intensity, according to claim 2, characterized in that the helicoidal groove (8) presents closed ends, constituting restricting stops of the rotational movement for the vessel (2), both in one and another direction, having been provided, that the tooth or the teeth (9) of the casing, operating as male thread,

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be established at the end of elastically deformable arms (10), which by means of an appropriate forcing, permit the coupling and uncoupling of the vessel (2) to the casing (1), for the replacement or change of the same.

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4.- Evaporator device of volatile products with variable evaporation intensity, according to claim 1 and 2, characterized in that said helicoidal groove (8) is superposed to the actual thread (11) of the container neck (2), previously usable for the complementary closing stopper.

5.- Evaporator device of volatile products with variable evaporation intensity, according to claim 1, characterized in that optionally, the actual thread (11) of the container (2) corresponding to the stopper used during the storage and commercialization phase of said vessel, as spare part of the device in its assembly, constitutes the means of axial displacement for the vessel in the centre of the casing, in which case, the teeth (9') of the latter, are in shape and in position appropriate to act on said thread (11).

6.- Evaporator device of volatile products with variable evaporation intensity, according to claims 4 and 5, characterized in that the vessel (2) is equipped with means of attachment to the casing (1) of the device, which impossibilitates the uncoupling of said vessel during the positional adjustment operation of the same for the adjustment of the intensity of evaporation, which consist in at least one locking tooth (13), associated to the casing (1) of the device, which acts on a stepping defined by a perimetral projection (14) operatively established on the body (2) of the container.

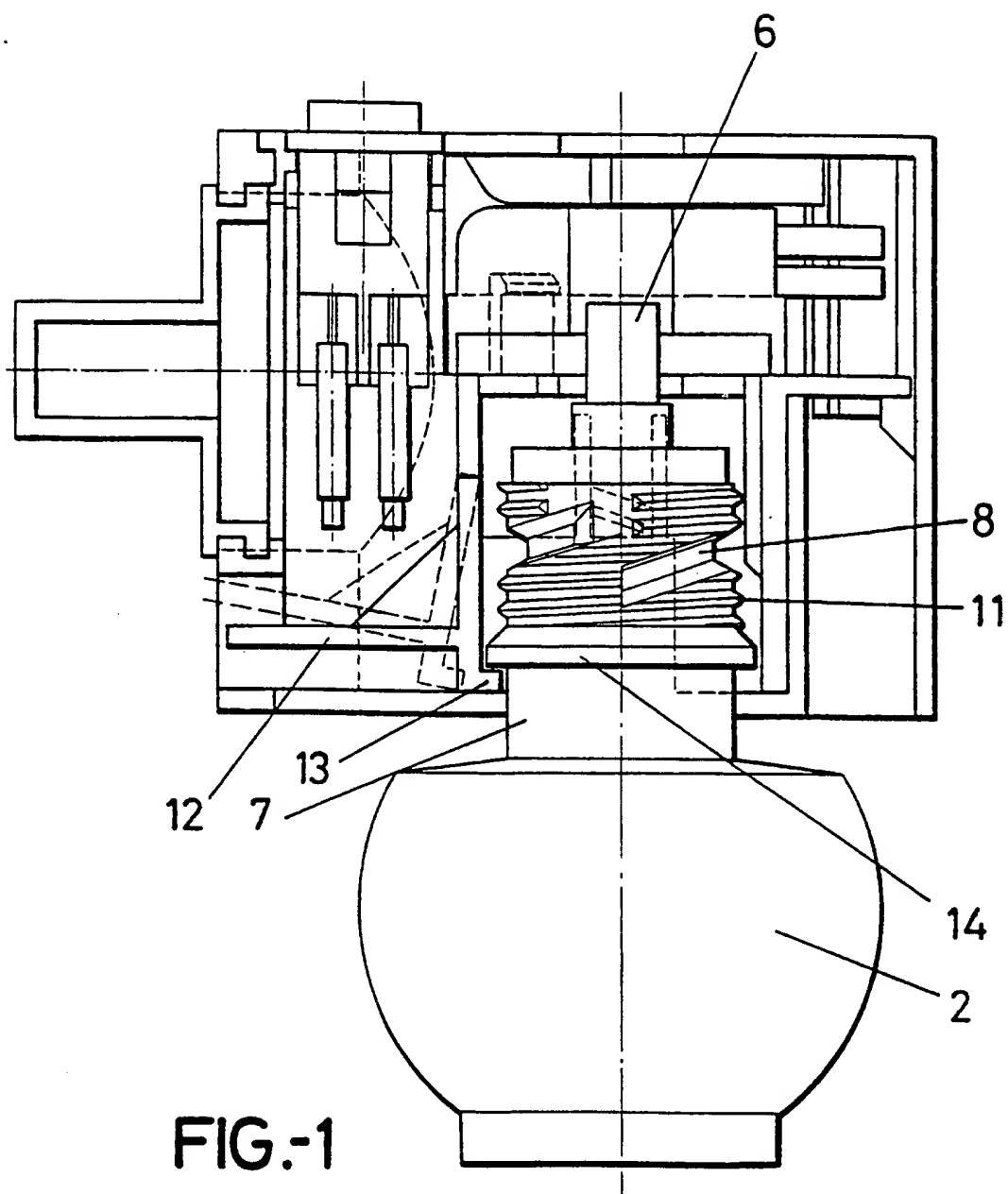
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7.- Evaporator device of volatile products with variable evaporation intensity, according to claim 6, characterized in that the retention tooth or teeth (13) acting on the stepping of the perimetral projection (14),  
5 are placed on elastically deformable flaps (16) of the casing (1) of the device.

8.- Evaporator device of volatile products with variable evaporation intensity, according to claim 6,  
10 characterized in that the retention tooth (13) acts on the stepping of the perimetral projection (14), forms part of a hook joined articulated to the casing (1) and activated manually for its unlocking from the container.

15 9.- Evaporator device of volatile products with variable evaporation intensity, according to the previous claims, characterized in that the body (2) of the container, is provided, on its on-view part, with a graded scale (17) which, in collaboration with a fixed  
20 pointer (18) of the casing (1) of the device, permits the visual control of the relative angular positioning between both elements, in order to detect visually the level of selected intensity of the evaporation.

25 10.- Evaporator device of volatile products with variable evaporation intensity, according to claims 1 through 8, characterized in that its casing (1) is provided at a low level with a wide notch (19), vertically elongated, on which a graded scale (17') is  
30 established laterally, with which a perimetral mark (18') of the body of the container collaborates, which detects the axial positioning of the latter as regards the casing, to control visually the selected intensity of evaporation.





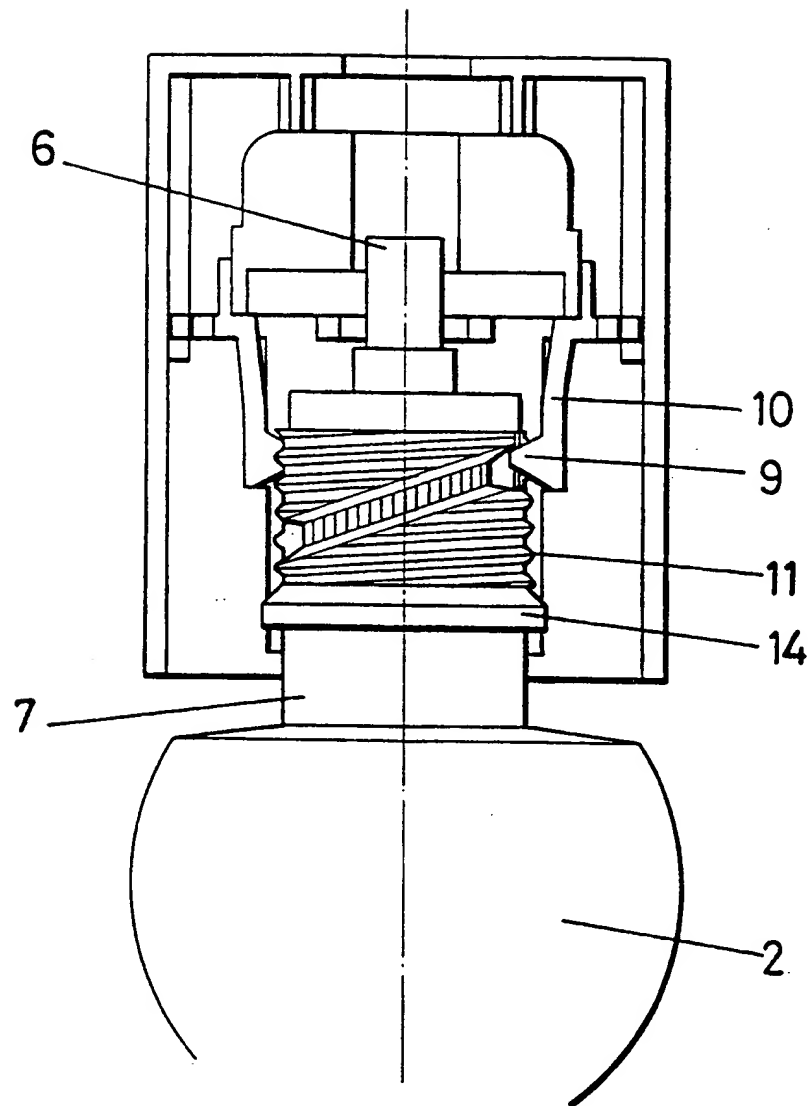


FIG.-2

FIG.-3

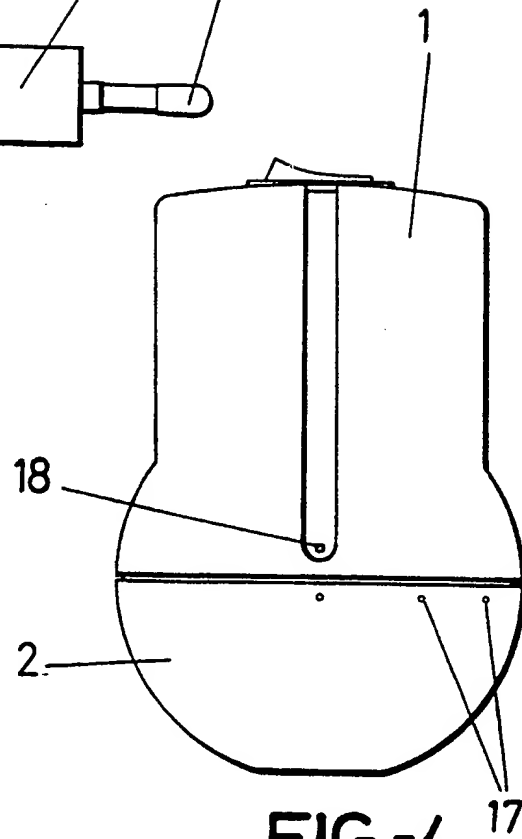
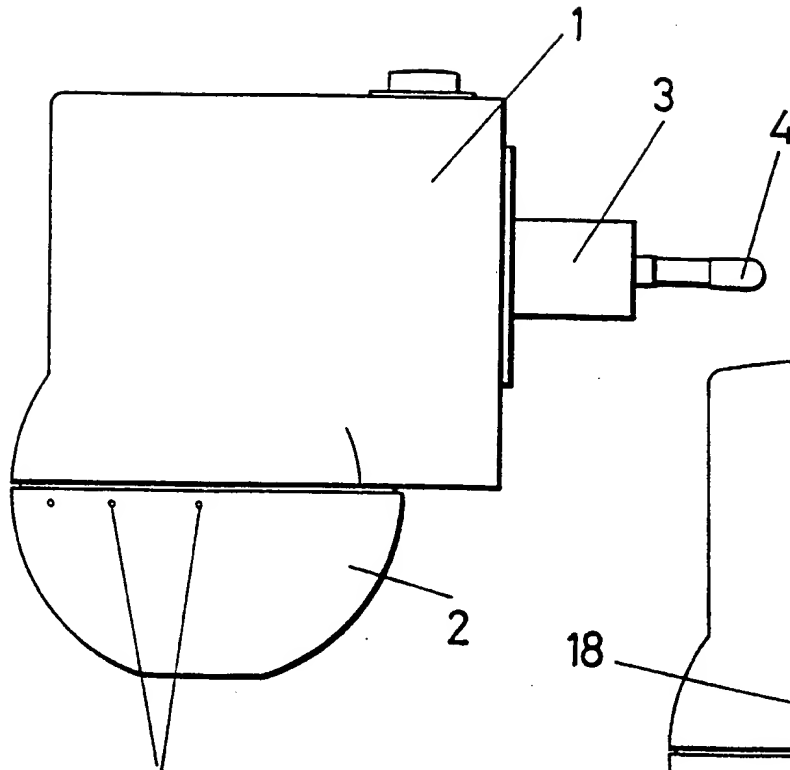


FIG -4

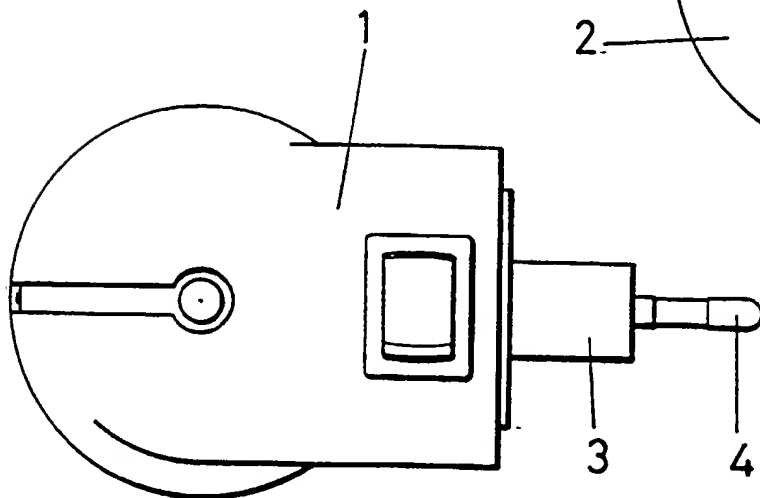
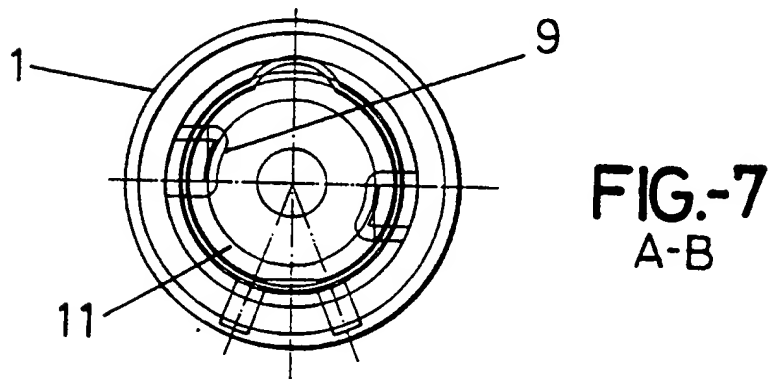
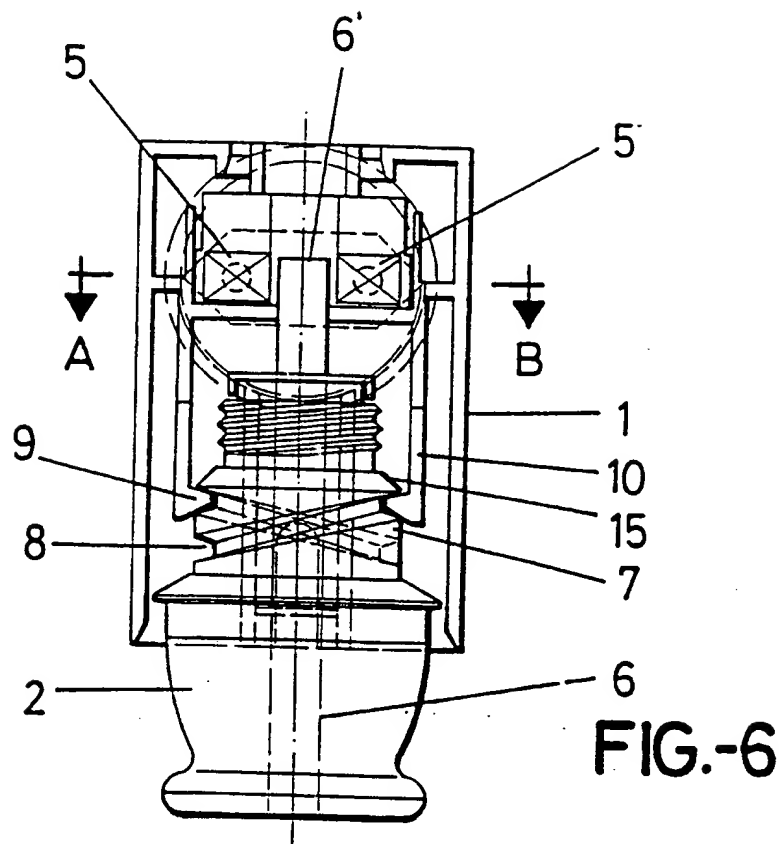
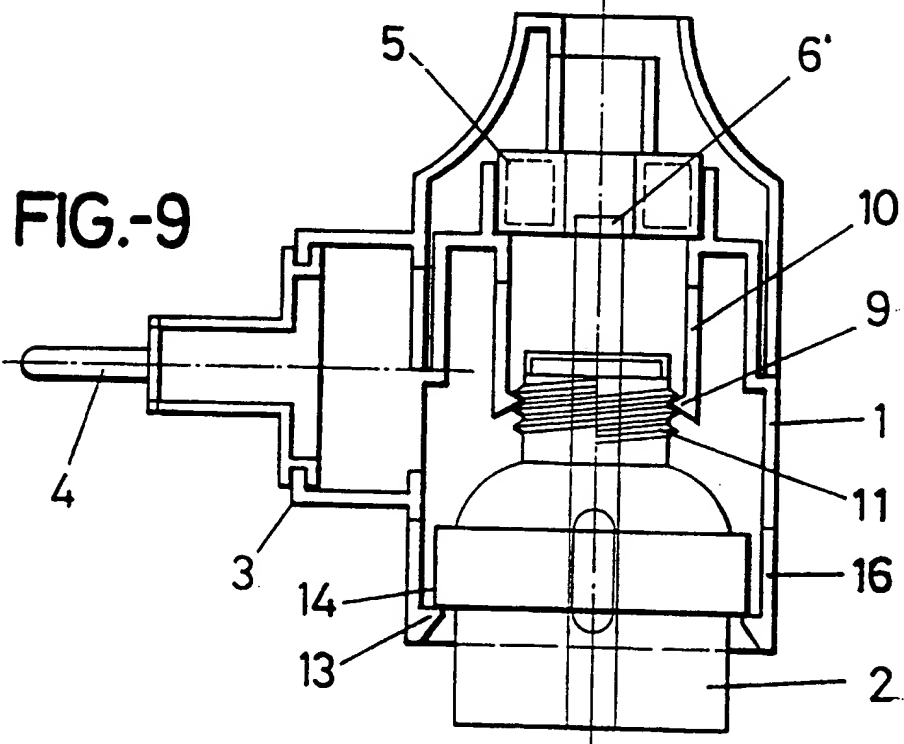
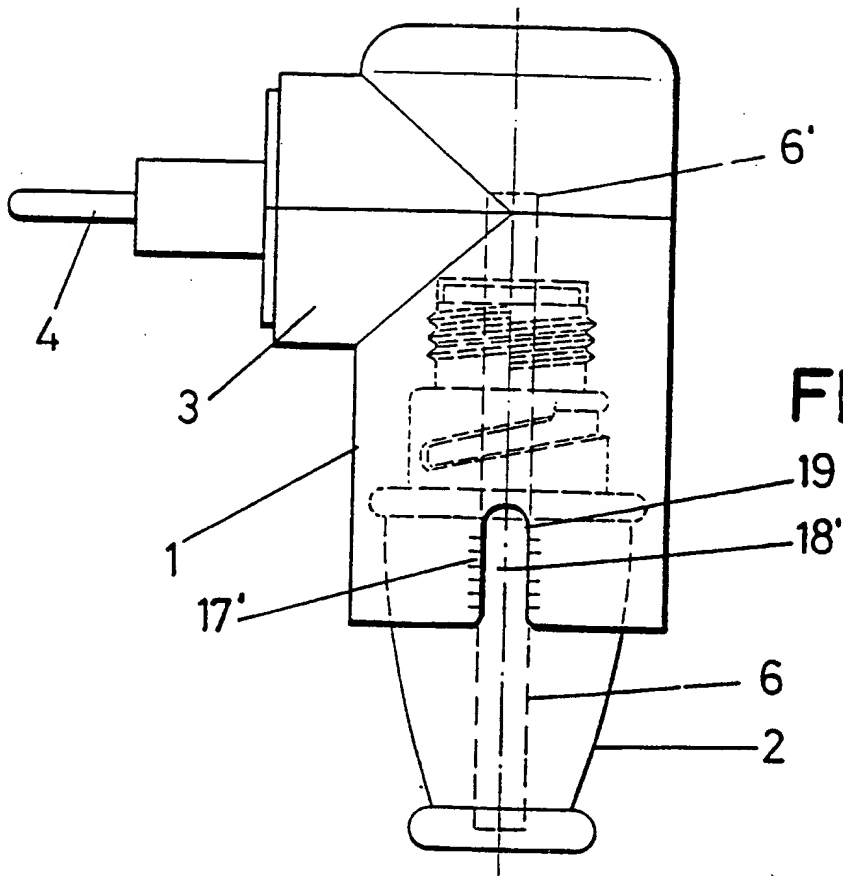


FIG.-5



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# INTERNATIONAL SEARCH REPORT

International Application No  
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<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 6 A01M1/20 A61L9/03		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 6 A01M A61L		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practical, search terms used)		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
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Y	see page 13, line 27 - page 14, line 3 see figures 4A-4F	6,7
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A	see page 5, line 15 - page 8, line 26 see figures	9,10
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International Application No  
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information on patent family members

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